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News Release

The full article can be seen at http://newscenter.nmsu.edu/Articles/view/11331/nmsu-engineering-professor-says-mine-spill-cleanup-will-be-complicated-long-lasting

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NMSU engineering professor says mine spill cleanup will be complicated, long-lasting

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The accidental release of an estimated 3 million gallons of waste from the Gold King Mine near Silverton, Colorado, on August 5 is now contained and controlled. However, testing and monitoring of the drinking water, irrigation water, public health, agriculture, fish and wildlife will be ongoing for some time, said Lambis Papelis, associate professor of civil engineering at New Mexico State University.

The contaminated sludge containing heavy metals, such as arsenic, lead and cadmium, was released into Cement Creek, a tributary to the Animas and San Juan River which traverses the Four Corners area in northeastern New Mexico and eventually flows into Lake Powell. New Mexico is one of seven states that are part of the Colorado River Basin – the Colorado River being a major source of irrigation water as well as water for millions of residents in the western United States.

"Nobody really knows the extent of the damage caused by the spill. Right now EPA is containing the flow and treating the water. But treating heavy metals is complicated because they behave differently under different conditions. It's not a one size fits all solution," Papelis said.

The EPA reported Sunday that the mine continued to discharge the waste at a rate of 500 gallons per minute. The EPA has been diverting the ongoing spill into two new settling ponds where the waste is being treated to lower its acidity before being discharged into a tributary.

"Initially, the pH of the water in the contaminated rivers was relatively low, in other words, the water was pretty acidic. Because of the high concentration of iron in the waste, arsenic will adhere to iron particles in water with a low pH, but other metals, such as cadmium, tend to bind stronger on iron at higher pH," explained Papelis. "The result of a higher pH level in the water causes the opposite reaction: some heavy metals will adhere to the iron, but arsenic binding will be weaker.

"The chemistry of these substances is different; fortunately, a slightly basic pH, common for many waters in the Southwest, is a good compromise when it comes to the ability of iron to bind both arsenic and metals such as lead and cadmium," Papelis said.

"New Mexico has one good thing in its favor – an abundance of carbonate rocks in our geology that tend to buffer the pH of the water, preventing it from getting too low," Papelis said.

While treatment of the contaminated water is ongoing, the long-term effects are unknown.

"No one knows exactly how the metals in the sediment will be released over time. They may be released over time in small quantities that may not cause the standards for either drinking or irrigation water to be exceeded. It is difficult to predict how far the sediment will be transported by the flow of the river or what will happen during a major hydrologic event like a flood. However, the contamination poses no direct threat to other parts of the state of New Mexico," Papelis said.

Because the discharge moved quickly, EPA officials said the contaminants did not pose an immediate threat. In the long-term, the threat to the environment diminishes as the water continues to be diluted by the river system, EPA officials said.

"It would be better to leave the sediment in place rather than trying to remove any contaminated sediments," said Papelis. "There are numerous state and federal agencies that will still have to monitor the environment for a long time to keep track of these toxins and their effect on the environment."

Papelis joined the NMSU civil engineering faculty in spring 2010. Previously, he was an associate research professor at the Desert Research Institute, in the Division of Hydrologic Sciences in Las Vegas, Nevada, and the director of the Water Resources Management program at the University of Nevada, Las Vegas, where his research focused on water quality, contaminant transport and geochemical modeling of trace metal interactions with soils and sediments.

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